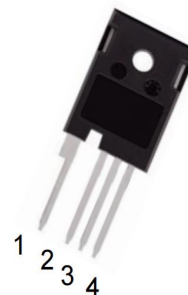




1.Features

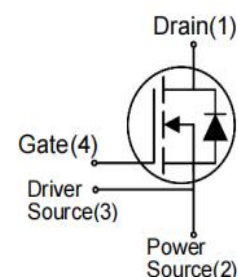
- V_{DS} 650V
- I_D 77A
- $R_{DS(ON)}$ 40 mΩ

TO-247-4



2.Mechanical Data

- Case:Molded Plastic,TO-247-4;
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Marking: marked on body.
- Mounting Position : Any.



3.Maximum Ratings and Electrical Characteristics

Rating at 25°C Cambient temperature unless otherwise specified

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	650	V
Drain Current Continuous	$T_C=25^{\circ}C$	I_D	77	A
	$T_C=100^{\circ}C$		55	
PeakDrain Current		I_{DM}	150	A
Gate-Source Voltage		V_{GSmax}	-8/+22	V
Recommend Gate-Source Voltage		V_{GSop}	-4/+18	V
Power Dissipation	$T_C=25^{\circ}C$	P_{tot}	283	W
	$T_C=100^{\circ}C$		141	
Maximum Junction Temperature		T_J	-40~175	°C
Storage Temperature Range		T_{stg}	-40~175	°C
Thermal Resistance from Junction to Case		$R_{th(j-c)}$	0.55	°C/W



Characteristics	Symbol	Test conditions	Min	TYP	Max	Unit	
Static Characteristics							
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=0.1mA$	650	-	-	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	1	-	μA	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=0V, V_{DS}=18V$	-	-	250	nA	
Gate Threshold Voltage	$T_j=25^\circ C$	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=10\mu A$	2.0	2.50	4.0	V
	$T_j=150^\circ C$			-	1.63	-	
	$T_j=175^\circ C$			-	1.60	-	
Drain-Source On-State Resistance	$T_j=25^\circ C$	$R_{DS(on)}$	$V_{GS}=18V, I_D=30A$	-	36	-	m Ω
	$T_j=175^\circ C$			-	43	-	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS}=600V$	-	2200	-	pF	
Output Capacitance	C_{oss}	$V_{GS}=0V$	-	200	-		
Reverse Transfer Capacitance	C_{riss}	$f=1MHz$	-	14	-		
Total Gate Charge	Q_g	$V_{DS}=400V, V_{GS}=-4/18V$ $I_D=30A$	-	113	-	nC	
Gate-Source Charge	Q_{gs}		-	29	-		
Gate-Drain Charge	Q_{gd}		-	43	-		
Switching Characteristics							
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=400V, V_{GS}=4V/18V$ $I_D=20A, R_G=2.5\Omega$	-	27	-	ns	
Turn-on Rise Time	t_r		-	21	-		
Turn-off Delay Time	$t_{d(off)}$		-	27	-		
Turn-off Fall Time	t_f		-	11	-		
Turn-On Energy	E_{on}		-	156	-	μJ	
Turn-Off Energy	E_{off}		-	21	-		
Drain-Source Diode Characteristics							
Diode Forward Voltage	$T_j=25^\circ C$	V_{SD}	$V_{GS}=-4V, I_{SD}=30A$	-	5.6	-	V
	$T_j=175^\circ C$			-	4.68	-	
Continuous Diode Forward Current	$T_j=25^\circ C$	I_S	$V_{GS}=-4V$	-	45	-	A
	$T_j=100^\circ C$			-	20	-	
Reverse Recovery Time	T_{rr}	$V_{GS}=-4V, I_{SD}=20A,$ $V_R=400V,$ $di/dt=900A/\mu s, T_j=25^\circ C$	-	15	-	ns	
Reverse Recovery Charge	Q_{rr}		-	100	-	nC	
Peak reverse recovery current	I_{rrm}		-	13	-	A	



4. Rating And Characteristic Curves

Fig.1 Output Characteristics $T_j = -40^\circ\text{C}$

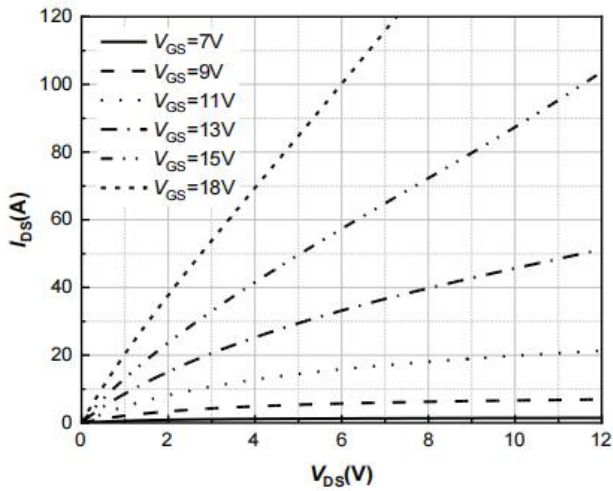


Fig.2 Output Characteristics $T_j = 25^\circ\text{C}$

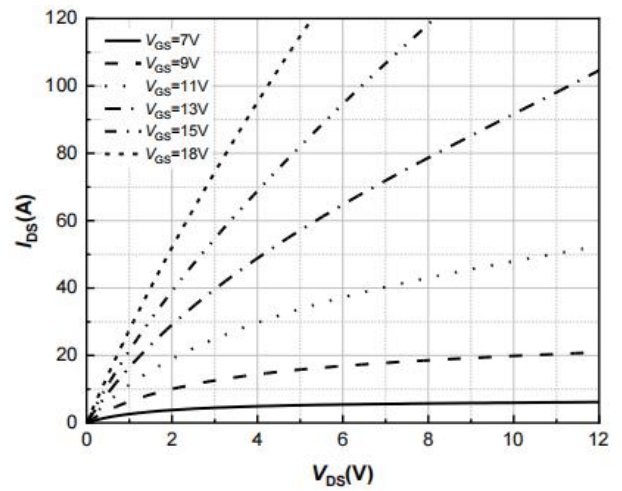


Fig.3 Output Characteristics $T_j = 175^\circ\text{C}$

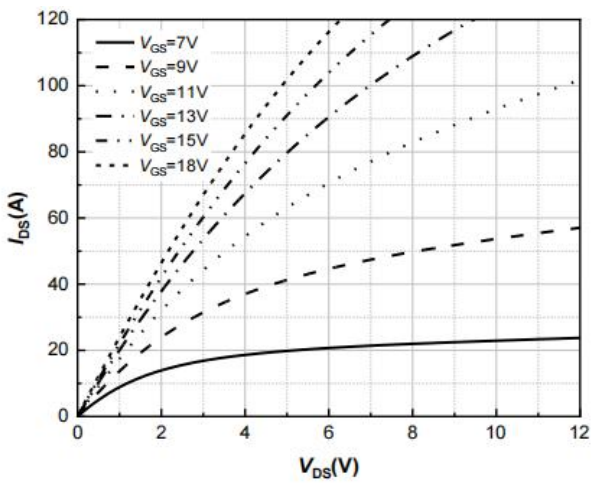


Fig.4 Normalized $R_{DS(on)}$ DS vs. Temperature

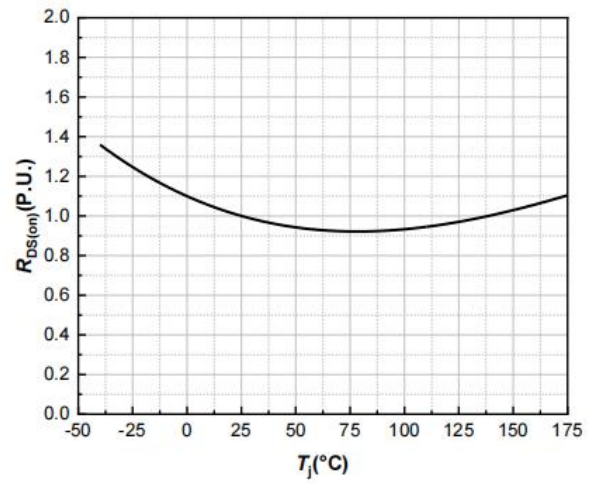


Fig.5 I_{DS} (A) VS $R_{DS(on)}$

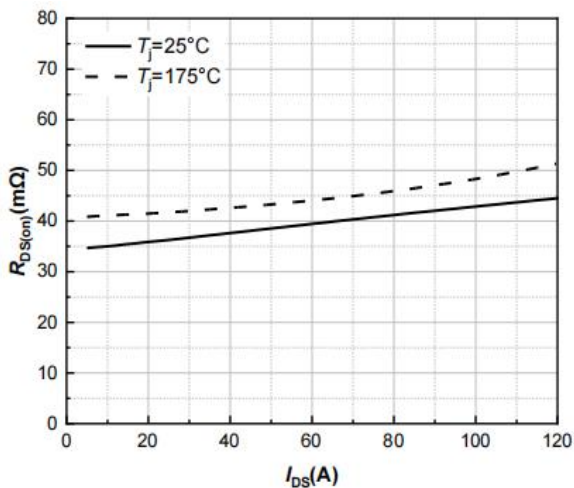


Fig.6 I_{DS} (A) VS T_j ($^\circ\text{C}$)

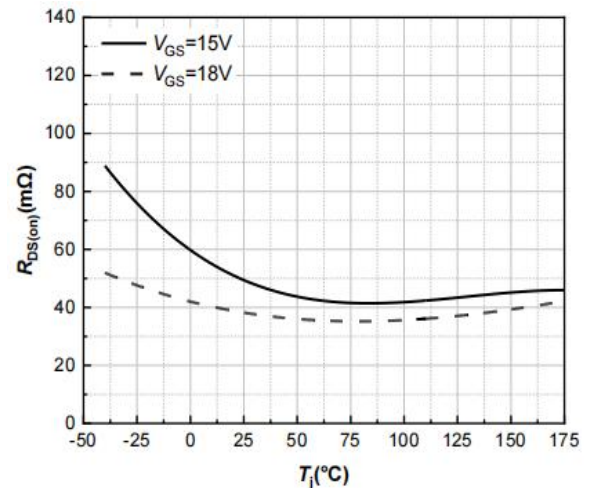




Fig.7 V_{GS} vs I_{DS} (A)

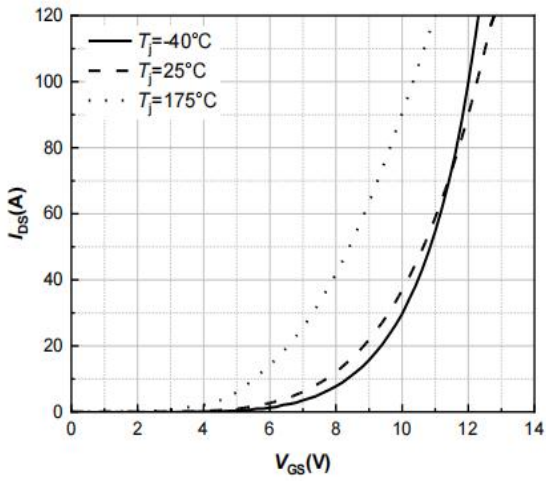


Fig.8 Body Diode Characteristic $T_j = -40^\circ\text{C}$

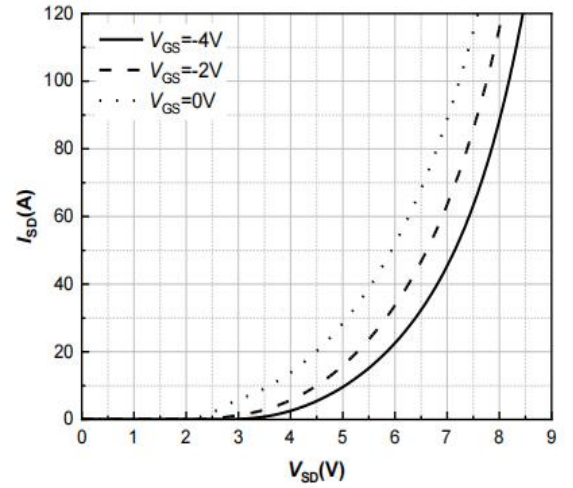


Fig.9 Body Diode Characteristic $T_j = 25^\circ\text{C}$

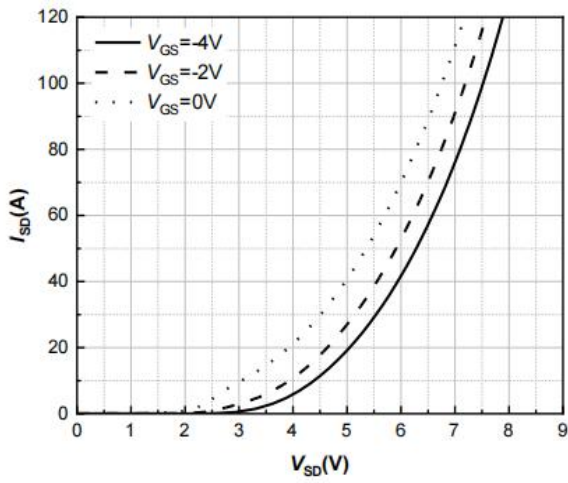


Fig.10 Body Diode Characteristic $T_j = 175^\circ\text{C}$

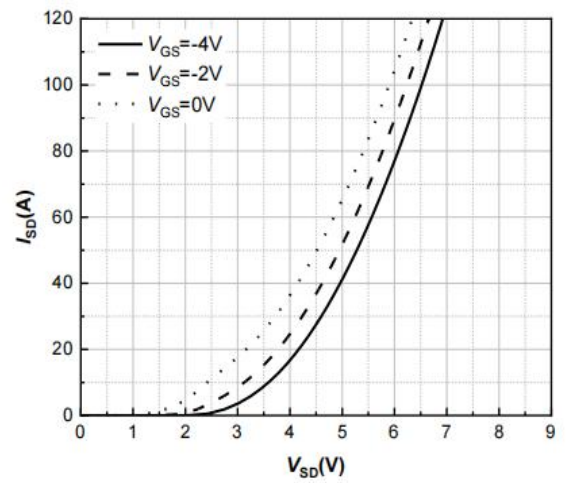


Fig.11 Threshold Voltage vs. Temperature

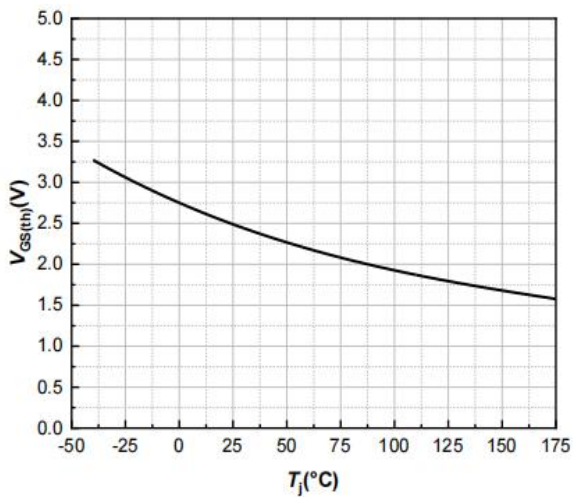


Fig.12 Gate Charge Characteristics

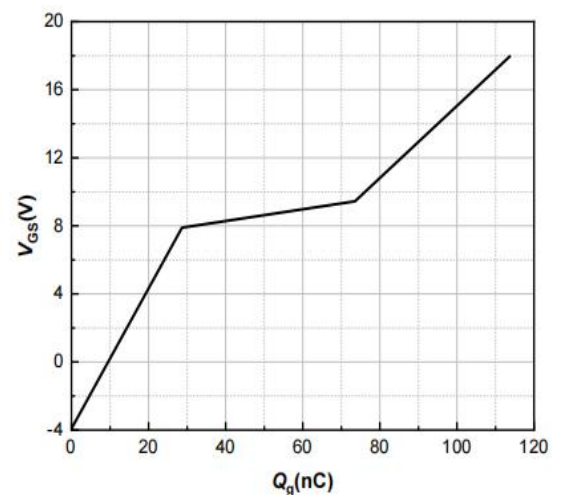




Fig.13 3rd Quadrant Characteristic $T_j=-40^{\circ}\text{C}$

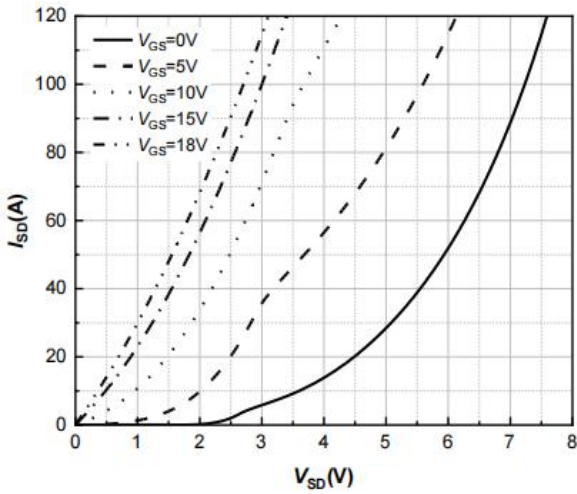


Fig.14. 3rd Quadrant Characteristic $T_j=25^{\circ}\text{C}$

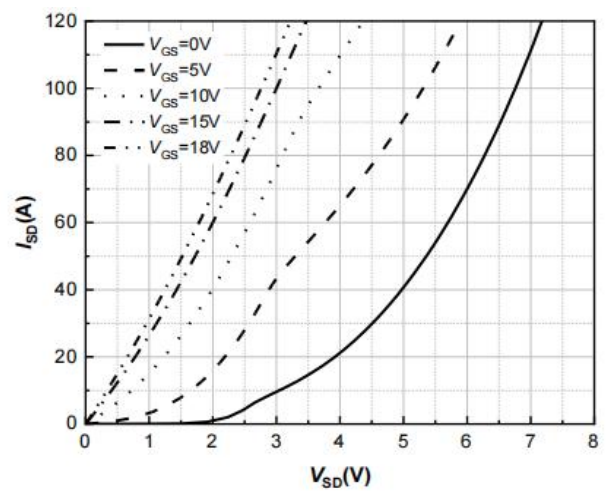


Fig.15 3rd Quadrant Characteristic

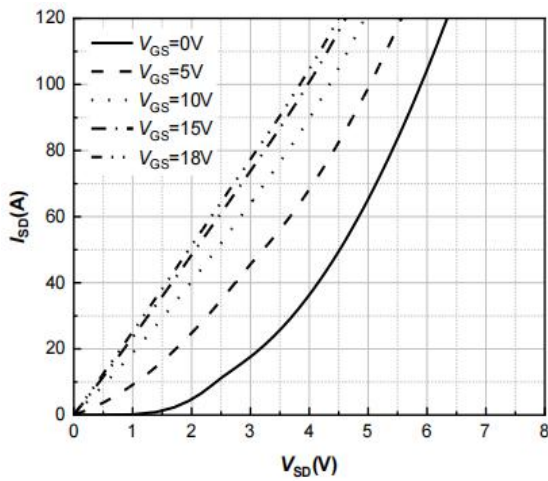


Fig.16 Output Capacitor Stored Energy

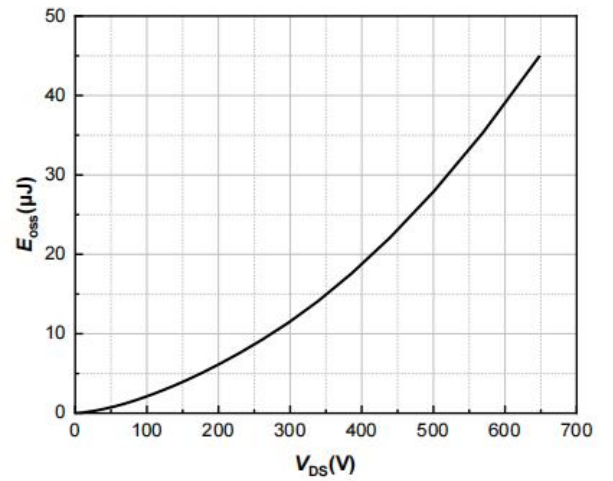


Fig.17 Capacitances vs. Drain-Source

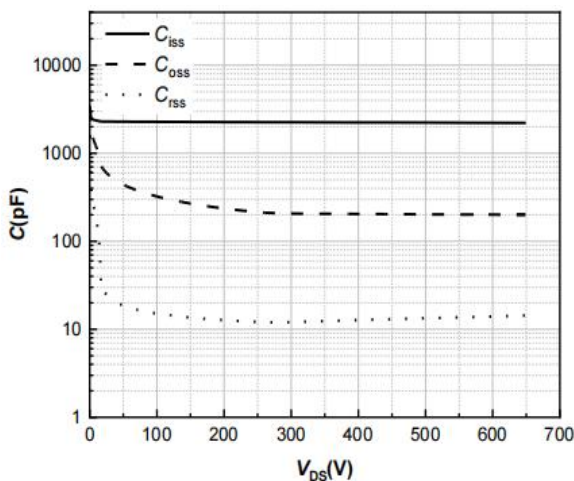


Fig.18 $I_{DS}(\text{A})$ vs. $T_c(^{\circ}\text{C})$

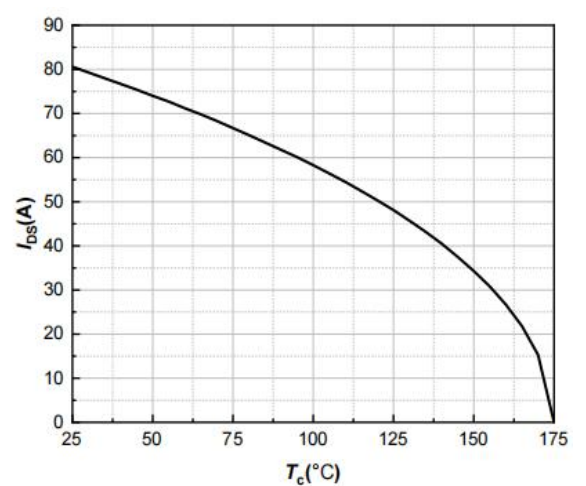




Fig.19 $P_{tot} t$ vs $T_c(^{\circ}C)$

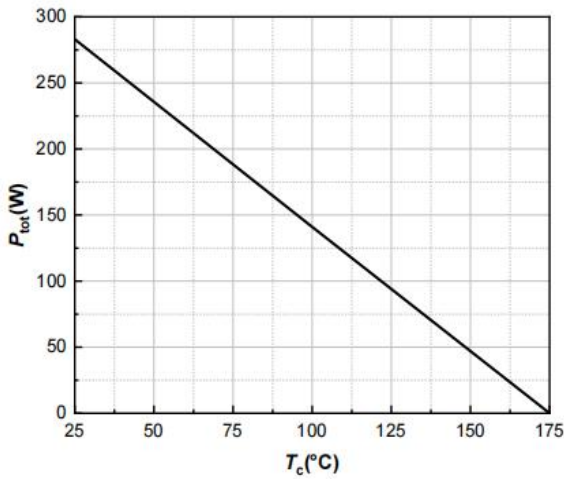


Fig.20 Transient Thermal Impedance

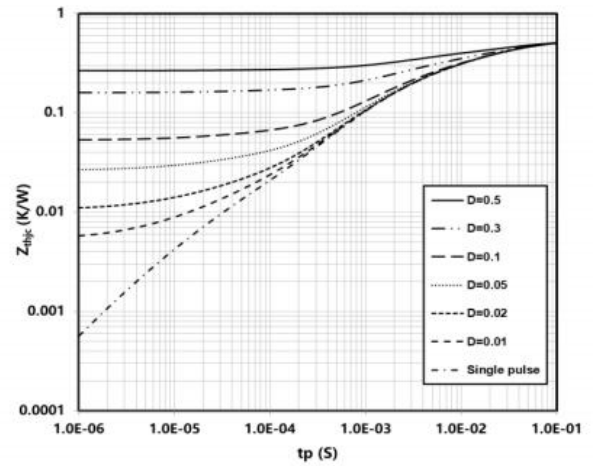


Fig.21 Clamped Inductive Switching Energy vs. Drain Current

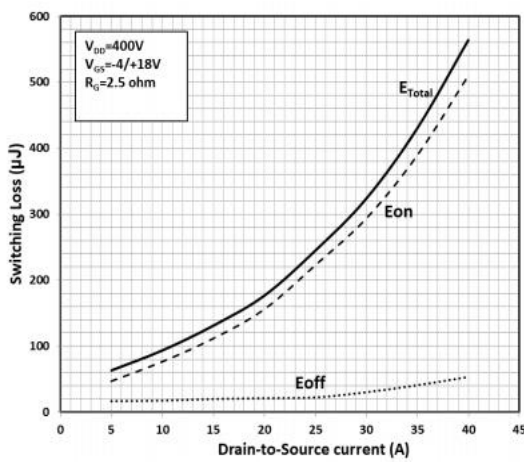


Fig.22 Clamped Inductive Switching Energy vs. R_G

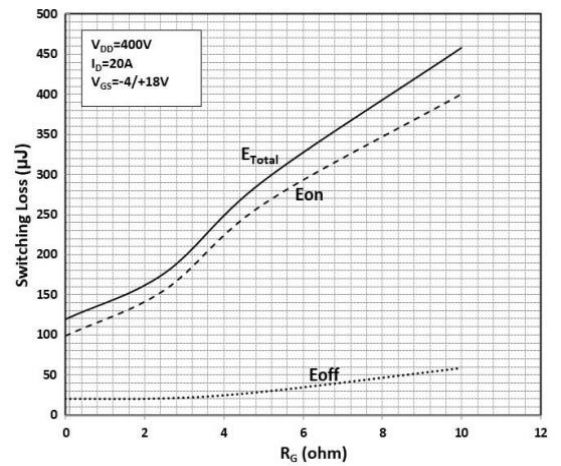


Fig.23 Switching Times vs. R_G

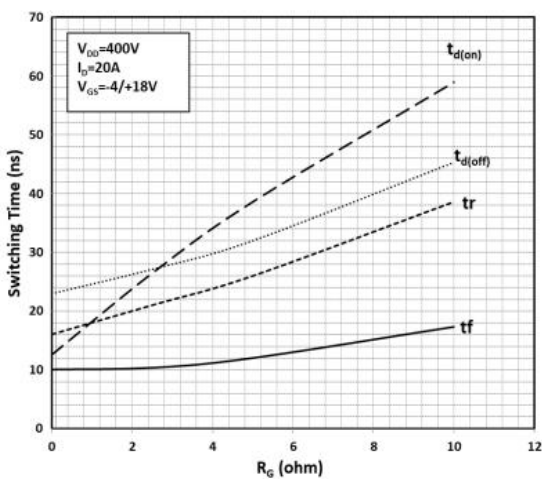
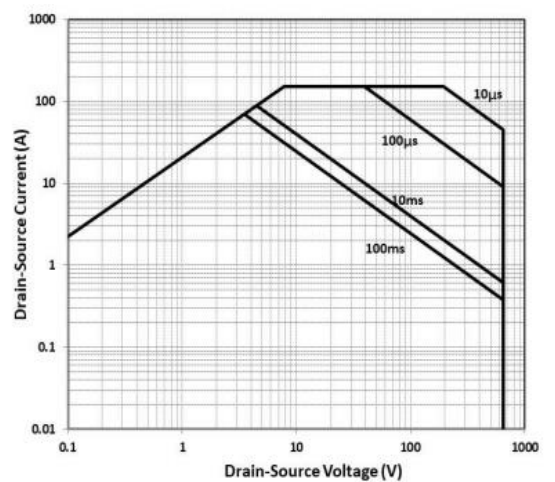


Fig.24 Safe Operating Area

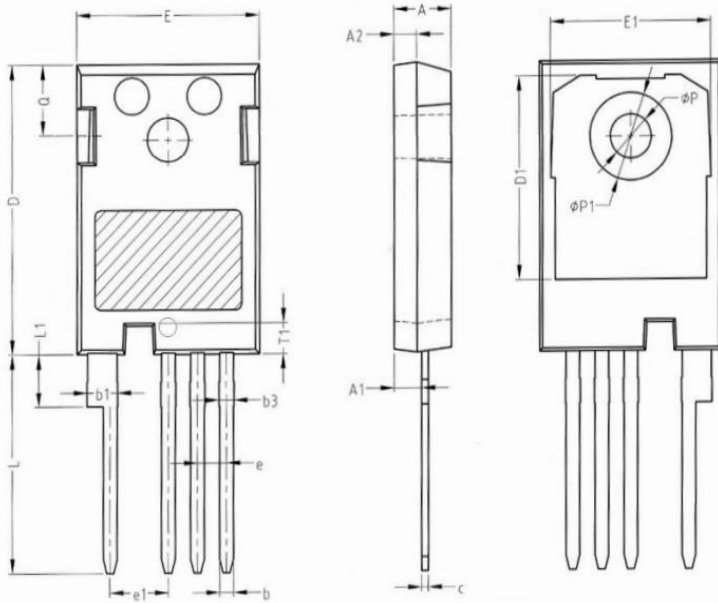




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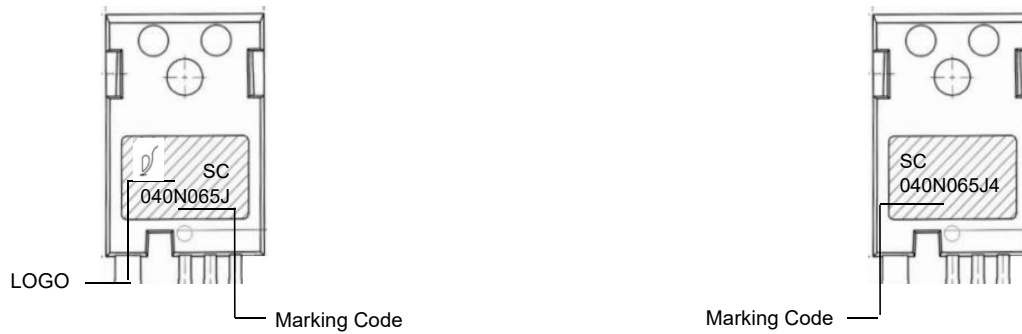
650V 77A N-CHANNEL POWER MOSFET

5. Dimensions



DIM	Unit(inch)		Unit(mm)	
	MIN	MAX	MIN	MAX
A	0.189	0.205	4.80	5.20
A1	0.087	0.103	2.21	2.61
A2	0.071	0.087	1.80	2.20
b	0.042	0.054	1.06	1.36
b1	0.092	0.115	2.33	2.93
b3	0.042	0.063	1.07	1.60
c	0.020	0.030	0.51	0.75
D	0.917	0.929	23.30	23.60
D1	0.640	0.663	16.25	16.85
E	0.620	0.635	15.74	16.14
E1	0.540	0.564	13.72	14.32
T1	0.093	0.104	2.35	2.65
e	2.54 BSC			
e1	5.08 BSC			
Q	0.216	0.240	5.49	6.09
L	0.680	0.704	17.27	17.87
L1	0.157	0.173	3.99	4.39
θp	0.134	0.150	3.40	3.80
θp1	7.19 REF			

6. Part Marking System



7. Package Information

Package	Packing Type	Quantity(pcs)
TO-247	Tube	25



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